

LAT Science Requirements Verification Tests

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Grey : requirement as is from LAT performance specs

Yellow: changes in the parameter

Red: move or remove or add knowledge or add parameters

Green: not discussed yet

Requirement: 5.2.1 Energy range/Effective area

Parameter: $> 300 \text{ cm}^2$ @ 20 MeV, $> 3000 \text{ cm}^2$ @ 100 MeV, $> 6400 \text{ cm}^2$ @ 300 GeV

Verification Plan: T and A

Measurements in a tagged beam of photons from 20 MeV up to 15 GeV and extrapolation of results to 300 GeV. Separate analysis for Front and Back section of tracker

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.2 Energy Resolution

Parameter: $< 50\%$ @ $< 100 \text{ MeV}$, $< 10\%$ @ 100 MeV - 10 GeV, $< 20\%$ @ 10 GeV - 300 GeV

Verification Plan: T and A

Not yet defined. We may add more parameters and we are now revisiting the needed knowledge on the energy resolution, its normalization and absolute scale.

Time: 2002 and 2004 (TBR)

Facilities: SLAC and/or CERN. We are investigating a test of Engineering Model at CERN for 200-300 GeV energies.

Requirement: 5.2.3 Peak Effective area

Parameter: $> 8000 \text{ cm}^2$

Verification Plan: T and A

Measurements in a tagged beam of photons up to 15 GeV. Separate analysis for Front and Back section of tracker

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.4 Effective area knowledge

Parameter: $> 100 \text{ MeV}$ changed from 20% to 10%, $< 100 \text{ MeV}$ changed from 50% to 10% (TBR)

Verification Plan: T and A

Measurements in a tagged beam of photons from 20 MeV up to 15 GeV and extrapolation of results to 300 GeV. Separate analysis for Front and Back section of tracker

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.4 Point Spread Function 68% (on axis)

Parameter: < 3.5 deg (front), < 6 deg (back) @ < 0.15 deg (front), < 0.3 (back)(TBR) @ 10 GeV - 300 GeV

Verification Plan: T and A

Measurements in a tagged beam of photons from 20 MeV up to 15 GeV and extrapolation of results to 300 GeV. Separate analysis for Front and Back section of tracker.

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.4.1 Knowledge on the Point Spread Function

Parameter: 10%

Verification Plan: T and A

Measurements in a tagged beam of photons from 20 MeV up to 15 GeV and extrapolation of results to 300 GeV. Separate analysis for Front and Back section of tracker. Setting up a study group to evaluate validation of simulation

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.5 Point Spread Function 95% (on axis)

Parameter: $< 3 \times \text{PSF}_{68\%}$

Verification Plan: T and A

Measurements in a tagged beam of photons from 20 MeV up to 15 GeV and extrapolation of results to 300 GeV. Separate analysis for Front and Back section of tracker. Setting up a study group to evaluate validation of simulation

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.7 Point Spread Function (off axis)

Parameter: $< 1.7 \times \text{PSF}$ (on-axis) @ 55 degrees

Verification Plan: T and A

Measurements in a tagged beam of photons from 20 MeV up to 15 GeV and extrapolation of results to 300 GeV. Separate analysis for Front and Back section of tracker.

Time: 2004 (TBR)

Facilities: SLAC. Many options are being discussed, coherent bremsstrahlung beam, backscattered laser beam, Van der Graff generator, incoherent bremsstrahlung beam

Requirement: 5.2.8 Field of View

Parameter: $> 2\text{sr}$

Requirement: 5.2.9 Source Location Determination

Parameter: $< 1\text{ arcmin}$ for $1 \times 10^7\text{ photons cm}^{-2}\text{ s}^{-1}$

Requirement: 5.2.10 Point Source Sensitivity

Parameter: $< 4 \times 10^9\text{ photons cm}^{-2}\text{ s}^{-1}$

Requirement: 5.2.11 Time accuracy

Parameter: better than 10 microseconds

Requirement: 5.2.12 Background Rejection

Parameter: $> 100000:1$ (TBR)

Requirement: 5.2.13 Deadtime

Parameter: $< 100\text{ microseconds}$ (TBR) per event

Requirement: 5.2.14 GRB location accuracy on-board

Parameter: $< 10\text{ arcmin}$ (TBR), 68% confidence radius

Requirement: 5.2.15 GRB notification time to spacecraft

Parameter: $< 3\text{ seconds}$ (TBR)

Requirement: 5.2.16 AGN location accuracy on-board

Parameter: $< 2\text{ degrees}$ (GOAL no requirement)

Requirement: 5.2.17 AGN notification time to spacecraft

Parameter: $< 1\text{ minute}$ after recognition (GOAL no requirement)